SAN CLEMENTE SPOTTED TOWHEE (*Pipilo maculatus clementae*)

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Criteria Scores

Population Trend	Range Trend	Population Size	Range Size	Endemism	Population Concentration	Threats
20	15	7.5	10	10	0	10

Special Concern Priority

Currently considered a Bird Species of Special Concern (year-round), Priority 1. This subspecies was not included on the original prioritized list (Remsen 1978), or on CDFG's (1992) unprioritized list. It was assigned a Category 2 candidate status by the USFWS (1994) until that category was eliminated (USFWS 1996).

Breeding Bird Survey Statistics for California

Data inadequate for trend assessment at the subspecies level (Sauer et al. 2000). A 10-yr (1989-1998) average of 34.14 birds recorded/route using breeding bird survey (BBS) data from Santa Catalina island (USGS 2001). San Clemente spotted towhees were observed at an average of 29.8% (10%-48%) of the stops. Based on the BBS data from Santa Catalina island, San Clemente spotted towhees are the twelfth most common breeding landbird on the island (USGS 2001).

General Range and Abundance

The San Clemente spotted towhee (*P. m. clementae*) is endemic to California where it is resident on San Clemente (formerly), Santa Catalina and Santa Rosa islands (AOU 1957). Today it is an uncommon to common breeding resident on Santa Rosa and Santa Catalina islands and formerly bred on San Clemente island, where it is now extirpated as a breeding species (Jones and Collins in press). Spotted towhees from mainland populations (*P. m. megalonyx*) are fairly frequent spring and fall transients and occasional winter visitors to the Channel Islands off the coast of southern California (Jones and Collins in press).

The San Clemente spotted towhee (*P. m. clementae*) is a weakly differentiated race which is closely allied to the adjacent mainland race (*megalonyx*; Swarth 1913, Johnson 1972). Although spotted towhees on Santa Rosa island have been placed with *clementae* (Miller 1951, AOU 1957, Johnson 1972), a number of authors have suggested that they are more closely related to the mainland subspecies *megalonyx* which also occurs on Santa Cruz island (Swarth 1913, Willett 1933, Grinnell and Miller 1944, Greenlaw 1996, P. Unitt pers. comm.). The taxonomic status of spotted towhees on Santa Rosa island should be reviewed.

Seasonal Status in California

Occurs year round; breeding season generally extends from early April until late July (Jones and Collins in press). *P. m. megalonyx* fledglings seen on Santa Cruz island on 1 September suggests that spotted towhees on the islands occasionally lay eggs as late as mid-to late July or early August (Pitelka 1950).

Historical Range and Abundance in California

No quantitative estimates of historic abundance exist. Howell (1917) reported that San Clemente spotted towhee were a "common resident" on San Clemente, Santa Catalina and Santa Rosa islands. Grinnell and Miller (1944) described them as a "common" to "abundant" permanent resident on Santa Catalina and San Clemente islands. San Clemente spotted towhees were closely tied to the distribution of suitable scrub (tall chaparral) and woodland vegetative cover.

Santa Rosa Island. San Clemente spotted towhees were reported as common on Santa Rosa island in July 1892 (C. P. Streator unpubl. field notes). Willett (1912) listed spotted towhees as a "common resident" and by 1927 H. H. Sheldon (unpubl field notes) recorded the species as "quite common." Grinnell and Miller (1944) provide no abundance estimate of this species on Santa Rosa island.

Santa Catalina Island. San Clemente spotted towhees were recorded as "abundant" in the 1890s (C. P. Streator unpubl. field notes, Grinnell 1899). By 1905, Richardson (1908:68) found

them “very abundant especially in the washes.” Grinnell and Miller (1944) also listed them as “abundant” on Santa Catalina island.

San Clemente Island. Most early reports list the species as a “common” or “very common” breeding resident (Grinnell 1897, Linton 1908, Willett 1912, 1933; Howell 1917). By 1939, the species was becoming rare. G. Willett (unpubl. field notes) could not find it “anywhere in the region covered, although we made particular efforts to do so. It is possible that its numbers have been reduced by feral cats which are plentiful on the island.” Grinnell and Miller (1944) provide no estimate of the abundance of spotted towhees on San Clemente island.

Recent Range and Abundance in California

The breeding range of San Clemente spotted towhees has declined during the past century. Vegetation striping from more than 150 years of overgrazing by feral herbivores and rooting by feral pigs on the Channel Islands has degraded scrub and woodland habitats that are critical breeding and foraging habitats for the San Clemente spotted towhee. Degradation of these habitats has led to the extirpation of a breeding population of San Clemente spotted towhees on San Clemente island (Stewart and Smail 1974, Jones and Collins in press). Since there is no data on what towhee numbers were like on these two islands prior to the introduction of non-native grazing mammals, it is hard to know it their populations have declined or prospered.

Santa Rosa Island. A. H. Miller (unpubl. field notes) found spotted towhees to be “very abundant” on Santa Rosa island in March 1950. By 1968, J. M. Diamond (unpubl. field notes) observed spotted towhees in “virtually all groves of big trees and in virtually all scrub habitats.” During the past thirty years, most observers have recorded San Clemente spotted towhees as common on Santa Rosa island (H. L. Jones and P. Collins unpubl. data). Today this species is a “common to very common breeding resident in all wooded and brushy habitats” on Santa Rosa island (Jones and Collins in press). Landbird monitoring surveys conducted by the National Park Service between 1994 and 1998 recorded an average of 0.618 spotted towhees per station with

towhees being recorded at an average of 45% (26.7%-60.0%) of the VCP stations (Fancy 2000). San Clemente spotted towhee densities on Santa Rosa island ranged from ~0.9 to 2.7 birds/km^2 (Fancy 2000). These densities are very low when compared to spotted towhee densities of <50 to 1,025 males/km^2 recorded elsewhere in California (Greenlaw 1996).

Santa Catalina Island. Jones (1975, 1991) listed the spotted towhee as a "very common" to "common resident" on Santa Catalina island. Today, they are a "fairly common to common breeding resident of canyon bottoms and densely vegetated hillsides" (Jones and Collins in press). BBS data from 1989-1998 (USGS 2001) and CBC data from 1988-1997 provide the only quantitative data to indicate that spotted towhees are a common breeding resident on Santa Catalina island. An average of 34.14 towhees were encountered per 2.5 hours of point counts along a BBS route run on Santa Catalina (USGS 2001), and an average of 67.5 birds were counted per party hour during ten years of CBCs at Santa Catalina island.

San Clemente Island. When J. M. Diamond visited the island in May 1968, he reported finding only "small numbers" of spotted towhees in the bottoms of several canyons (J. M. Diamond unpubl. field notes). At that time he estimated the island-wide population at <100 individuals. When the island was next visited in 1972, only two spotted towhees were observed (Leatherwood and Coulombe 1972). The last observations of birds thought to be the endemic *clementae* were of three birds seen in April 1973, and an immature bird seen on 10 July 1975 (Jones and Collins in press). Since no spotted towhees have been found on San Clemente island during the breeding season after 1975, despite intensive surveys for them, the endemic *clementae* breeding population on this island is believed to be extinct (Jorgensen and Ferguson 1984, Jones and Collins in press). There have been more than fifty sightings of migrant spotted towhees on San Clemente island since 1980 (Jones and Collins unpubl data). Migrants are seen from 23 September through 31 March with most observations during the winter months (Jones and Collins in press).

Ecological Requirements

The ecological requirements of the San Clemente spotted towhee are largely undescribed, however, they are probably very similar to those reported for spotted towhees on the mainland. According to Grinnell and Miller (1944:474-475), San Clemente spotted towhees inhabit "fairly tall chaparral, especially along watercourses," wild cherry thickets, cactus patches and patches of scrub oak and toyon. On San Clemente island, Grinnell (1897:19) found spotted towhees "along the larger ravines and canons, wherever there is a thick growth of wild cherry bushes." On Santa Catalina island, spotted towhees are resident in "chaparral and most woodland communities on the island" (Jones 1976: c-2), and are usually associated with areas of "brushy ground-cover…. in canyon bottoms and on densely vegetated hillsides…" (Jones 1991:20). On Santa Rosa island, spotted towhees have been observed in patches of cactus, *Artemisia* and scrub oak (A. H. Miller unpubl. field notes) and in "virtually all groves of big trees and all scrub habitats" (J. M. Diamond unpubl. field notes). On Santa Cruz island, *P. m. megalonyx* inhabit coastal sage scrub, chaparral, woodlands and pine forest (Laughrin 1982). Shrubs and other thicket-forming plants commonly associated with San Clemente spotted towhees include: scrub oak (*Quercus dumosa*), sumacs (*Rhus*), prickly pear cactus (*Opuntia*), baccharis (*Baccharis pilularis*), California sagebrush (*Artemisia californica*), poison oak (*Toxicodendron diversilobum*), elderberry (*Sambucus*), manzanita (*Arctostaphylos*), ceanothus (*Ceanothus*), toyon (*Heteromeles arbutifolia*), chamise (*Adenostema fasciculatum*), island cherry (*Prunus ilicifolia*), buckthorn (*Rhamnus*), and mountain mahogany (*Cercocarpus*).

Spotted towhees on the mainland are "conspicuous breeders in coastal scrub, chaparral, brushy riparian thickets, and on the shrubby edges or openings of the remaining forest or woodland plant communities" (Shuford 1993: 369). Shrub and thicket formations used as breeding and foraging habitat by spotted towhees are "characterized by dense, broadleaf shrubby growth (variously described as brush, thickets, or tangles) only a few meters tall, with or without emergent trees, that provide deep, sheltered, semi-shaded litter and humus on ground, and screen of twigs and

foliage close overhead" (Greenlaw 1996: 8). Spotted towhees "require a well-developed leaf litter and humus layer in which to forage" and, as a result, tend to "avoid areas of dense shrubbery when it occurs within the heart of closed-canopy conifer or mixed evergreen forests" (Shuford 1993: 369). Spotted towhees are inveterate ground foragers who favor sites with well-developed litter-duff and overhead screening by branches and foliage. They obtain the majority of their food "from the middle or lower layers of the leaf litter and humus or in the upper layers of the soil proper where it is gleaned or pecked after uncovering" (Shuford 1993: 370). They typically scratch for food in litter-duff under trees and large isolated shrubs and in dense tangled thickets (Greenlaw 1996). Spotted towhees are also known to occasionally "peck and glean insects from leaves, branches, and lichens in bushes and trees" and to "take fruits and berries from trees or branches while perched or from hovering flight" (Shuford 1993: 370). Spotted towhees' year-round diet in California (n=139) is about 24% invertebrate and 76% vegetable (Beal 1910). Their diet varies seasonally from 49%-62% vegetable matter in spring and summer to 91%-92% in fall and winter (Martin et al. 1951). The summer diet of birds in the Sierra Nevada was comprised of 84% animal matter (Dahlsten et al. 1985). Spotted towhees consume all developmental stages (larvae, pupa, adult) of a wide variety of insects (mainly beetles, true bugs, ants, bees, wasps, caterpillars, moths, crickets, grasshoppers and flies) and litter arthropods (spiders, millipeds and sowbugs) (Shuford 1993, Greenlaw 1996). They also feed extensively on small seeds, fleshy fruits and berries, acorns and grain (Greenlaw 1996). The most frequently eaten fruits and berries in California are elderberries, wild cherries, coffeeberries, oak acorns, hollyleaf redberries, snowberries, gooseberries, poison oak drupes, black berries, toyon, honeysuckle, manzanita, twinberries, sumac, and madrone (Beal 1910, Davis 1957, Greenlaw 1996).

Spotted towhees usually nest in litter on the ground and occasionally in bushes or vine tangles from 0.6 to 3.6 m high (Davis 1960). The intensity of predation on ground nests apparently influences the placement of nests in vegetation above ground (Davis 1960). Nests are typically

built in "depressions with the rim flush or slightly above ground level, invariably in sites protected from above by overhanging bushes, vines, or clumps of grass" (Shuford 1993: 369). Nest sites are generally situated in "grassy and/or leaf-littered areas on the edges of thickets or near isolated shrubs or trees" where woody plants provide overhead shelter and herbaceous plants and grasses provide protective lateral screening (Shuford 1993: 369). Pairs will raise two and occasionally three broods in a single season and will renest following nest failure (Davis 1960).

There are no studies available regarding the factors that limit San Clemente spotted towhee populations. Degradation of scrub (chaparral) and woodland habitats on Santa Rosa, Santa Catalina and San Clemente islands from more than 150 years of intensive grazing by a variety of domestic and feral herbivores (goats, sheep, cattle, bison, deer and elk), and rooting by feral pigs has had, and is continuing to have significant adverse affects on suitable breeding and foraging habitat for San Clemente spotted towhees. Moderate to heavy grazing by feral herbivores on the islands has altered scrub and woodland community structure by depleting the herbaceous layer, reducing foliar cover and species richness, eliminating survival of propagules, and increasing erosion (Van Vuren and Coblentz 1987, Klinger et al. 1994, Laughrin et al. 1994). Changes to the structure of native scrub and woodland habitats on Santa Cruz island from intensive sheep grazing were shown to result in a dramatic decline in *P. m. megalonyx* density. Van Vuren and Coblentz (1987) recorded 23 birds/km^2 in a lightly grazed chaparral-grassland community but found no spotted towhees in a similar habitat that was moderately grazed. Feral pig rooting and trampling in chaparral and woodland habitats has resulted in: (1) destruction of the litter layer and upper soil horizons, (2) increased rates of erosion on steep slopes, and (3) a decline in rates of regeneration of herbaceous annuals and woody plants (Baber 1982, Schuyler 1988). These disturbances have in turn disrupted nutrient cycling in affected habitats and severely impacted the litter invertebrate community through a reduction in the numbers and diversity of invertebrate species, and litter and upper soil microorganisms (Baber 1982). This reduction in plant cover has undoubtedly allowed mammalian

(island fox, feral cat, feral pig) and avian predators to find nests and take eggs and young of species that nest on or near the ground like the San Clemente spotted towhee. Thus, nest and fledgling predation from native and introduced predators, coupled with degradation of preferred scrub and woodland breeding and foraging habitats by feral herbivore grazing and feral pig rooting are the principal factors that are currently limiting San Clemente spotted towhee populations on the Channel Islands. California ground squirrel (*Spermophilus beecheyi*) predation on the eggs and young of spotted towhees is an additional factor that may be limiting towhee populations on Santa Catalina island.

Threats

Loss, fragmentation and degradation of scrub and woodland habitats from overgrazing by feral herbivores (feral goats and sheep) and rooting by feral pigs, increased levels of nest predation from native (island fox) and nonnative (feral cat) predators, and increased fire frequency and intensity are the principal factors that threaten San Clemente spotted towhee populations. Intensive browsing pressure from feral goats on Isla Guadalupe and San Clemente island resulted in the extirpation of endemic populations of spotted towhees on these two islands (Howell and Cade 1954, Jones and Diamond 1976). Alteration of brush and woodland habitats and their understories by feral herbivore grazing and feral pig rooting has increased the susceptibility of ground nesters, like San Clemente spotted towhees, to predation from both native (e. g. island fox, California ground squirrel, Cooper's and sharp-shinned hawks) and nonnative (feral cat, black rat and feral pig) nest predators. As feral herbivores and feral pigs are eradicated from the Channel Islands, it is unknown what the long-term effects will be to San Clemente spotted towhee populations. Scrub and woodland habitats are expected to show increased germination and seedling survivorship, increased vegetative vigor, and increased overall vegetative cover (Coblentz 1977, Wehtje 1991, Klinger et al. 1994, Laughrin et al. 1994). Over the long-term, this will lead to the development of broad, dense, decadent stands of scrub (chaparral and coastal sage scrub) and woodland (ironwood, oak and

conifer woodlands) habitats that San Clemente spotted towhees are known to favor. The quality and extent of this scrub and woodland habitat for breeding and foraging will ultimately set upper limits on San Clemente spotted towhee population size. Although feral herbivores and pigs will ultimately be eradicated from the Channel islands, feral cats are expected to remain on at least three of the islands (San Clemente, Santa Catalina and San Nicolas). Feral cats will continue to cause increased mortality in the San Clemente spotted towhee population on Santa Catalina island and in any reintroduced population of spotted towhees on San Clemente island. Controlling or eliminating episodic factors such as fire and/or light to moderate grazing or browsing will, over the long-term, lead to the development of dense, decadent stands of scrub and woodland habitats. As vegetative cover increases on the islands, fire frequency and intensity are also expected to increase, especially on islands that have high levels of human visitation (Santa Catalina island) or intrusive military activities (e. g. onshore bombardment activities; San Clemente island). Large, "hot" fires are expected to temporarily reduce suitable breeding and foraging habitat for spotted towhees at least until seral development on affected lands once again attract spotted towhees.

Management and Research Recommendations

- Reestablish a viable breeding population of San Clemente spotted towhees onto San Clemente island.
- Conduct research to identify specific habitat requirements (vegetative and physiographic) and ecological conditions that will support self-sustaining populations; in particular determine demographic rates for spotted towhee populations on each of the islands.
- Initiate studies to determine how fire (frequency and intensity of controlled burns) can be used in scrub and woodland habitats on the islands to help maintain and/or promote suitable breeding and foraging habitat for San Clemente spotted towhees.

- Complete feral animal eradication programs and support the implementation of ecological restoration plans proposed by the Santa Catalina Island Conservancy for Santa Catalina island, the National Park Service for Santa Rosa and Santa Cruz islands, and the U. S. Navy for San Clemente island.
- Initiate field studies designed to gather basic descriptive attributes (e.g. phenology, breeding biology, ecology, food habits, population demography (life tables), behavior, and behavioral ecology) that can be used to fill in data gaps that exist in nearly all aspects of the life history of the San Clemente spotted towhee.
- Develop and implement a more intensive species-specific monitoring program designed to better detect significant fluctuations in *P. m. clementae* populations. Data from such a monitoring program would provide more accurate data on the distribution and relative abundance of *P. m. clementae* populations on each of the islands.
- Implement a genetic study using mitochondrial and single-locus micro-satellite DNA analyses to elucidate the genetics, phylogeny, and taxonomic relationships of the San Clemente spotted towhee. Such a study would: (1) help to clear up the uncertainty regarding the taxonomic status of spotted towhees on Santa Rosa and Santa Cruz islands, (2) identify which island population to use as the stock for reintroducing spotted towhees back onto San Clemente island, and (3) help elucidate the population genetic structure of San Clemente spotted towhee populations.
- Develop and implement a program to control and/or eradicate feral cats on Santa Catalina and San Clemente islands. While the ultimate goal of such a program should be the complete removal of feral cats from both islands, the control (cat reduction) program should at a minimum reduce the level of predation on young spotted towhees that this introduced mammalian predator is exerting on San Clemente spotted towhee populations.

Monitoring Needs

An existing USFWS BBS and National Audubon Society CBC are providing some useful demographic data for monitoring changes in the population dynamics of the San Clemente spotted towhee population on Santa Catalina island. However, there are no BBS or CBC counts currently being conducted on San Clemente or Santa Rosa islands. A landbird monitoring program implemented by the NPS on Santa Rosa island (Super et al. 1991) is currently in the process of being redesigned to use variable circular plots (VCPs) as the basic field unit for monitoring landbird density (McEachern 2000, L. Dye pers. comm.). The Santa Catalina Island Conservancy is also in the process of setting up a similar off-trail VCP-based landbird monitoring program on Santa Catalina island (J. Floberg pers. comm.). Both of these monitoring programs should develop data that can be used to: (1) promote an index of breeding population size, and (2) monitor overall population changes with respect to changes in habitats. Annual monitoring of San Clemente spotted towhee populations on the Channel Islands should use standardized off-trail VCP counts that are stratified by habitat type (Ralph et al. 1993). Estimating demographic variables (annual adult survival and breeding productivity) using constant-effort mist netting methods of the Monitoring Avian Productivity and Survival (MAPS) program (DeSante 1992, DeSante et al. 1993) may be feasible with this species. However, mist netting on the islands in the types of scrub and woodland habitats that this species prefers may be difficult, and island logistics and weather place significant logistical constraints on being able to run constant-effort mist netting (MAPS) stations on the islands.

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